O I P E JC161
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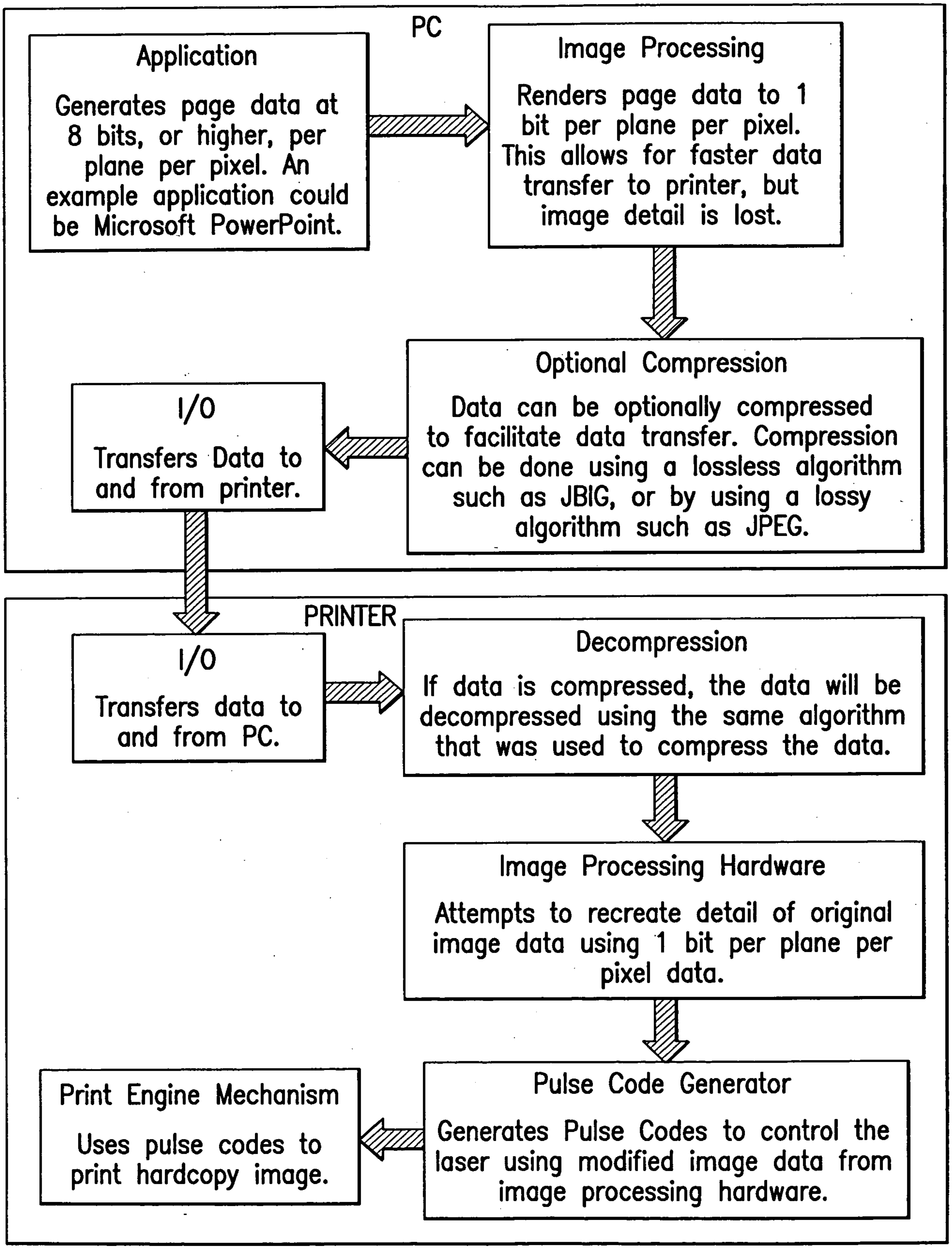
PATENT & TRADEMARK OFFICE



Application

Generates page data at 8 bits, or higher, per plane per pixel. An example application could be Microsoft PowerPoint.

Image Processing

Renders page data to 1 bit per plane per pixel. This allows for faster data transfer to printer, but image detail is lost.

Optional Compression

Data can be optionally compressed to facilitate data transfer. Compression can be done using a lossless algorithm such as JBIG, or by using a lossy algorithm such as JPEG.

I/O

Transfers Data to and from printer.

I/O

Transfers data to and from PC.

Decompression

If data is compressed, the data will be decompressed using the same algorithm that was used to compress the data.

Image Processing Hardware

Attempts to recreate detail of original image data using 1 bit per plane per pixel data.

Pulse Code Generator

Generates Pulse Codes to control the laser using modified image data from image processing hardware.

Print Engine Mechanism

Uses pulse codes to print hardcopy image.

FIG. 1
(PRIOR ART)

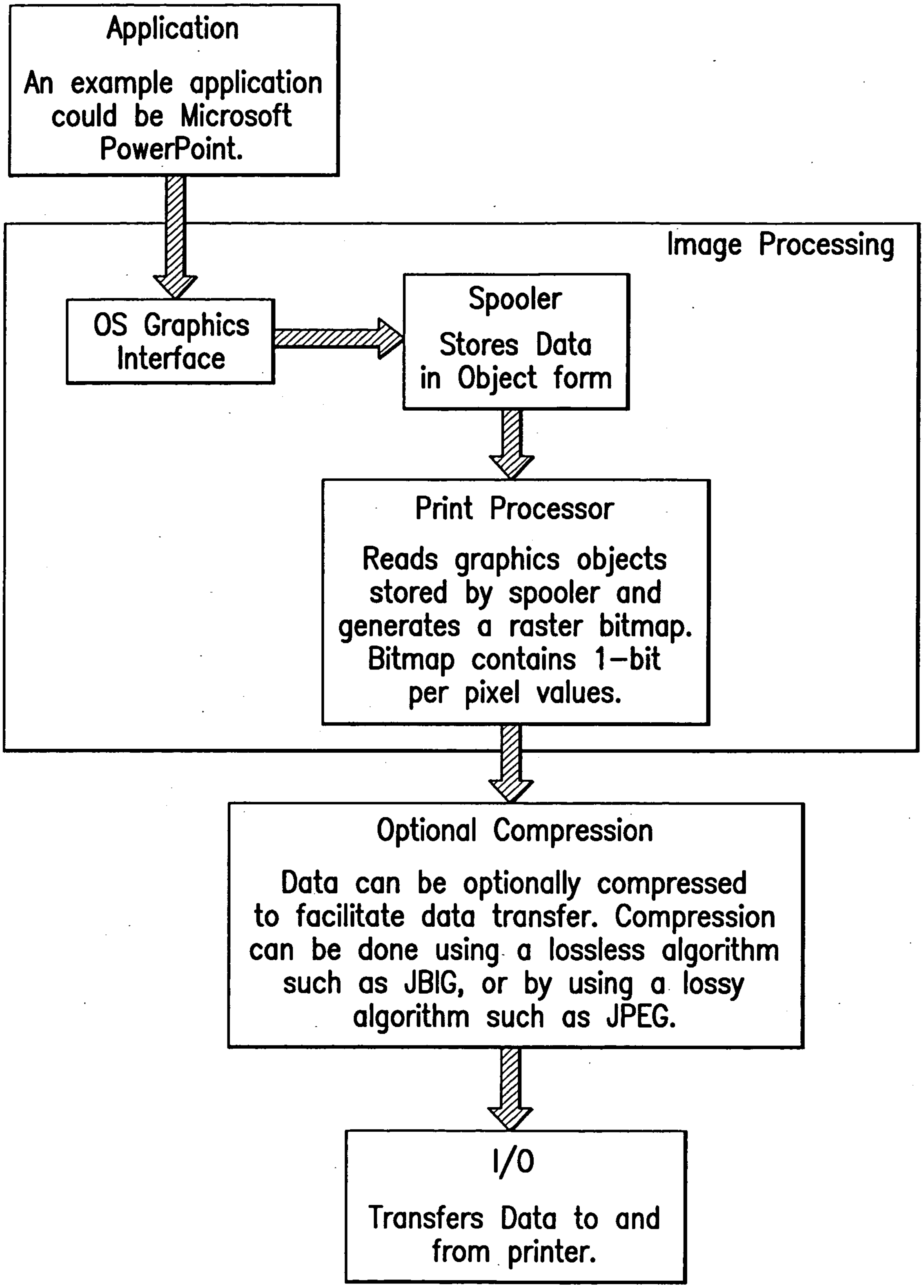

Application
An example application could be Microsoft PowerPoint.
Image Processing
OS Graphics Interface
Spooler
Stores Data in Object form
Print Processor
Reads graphics objects stored by spooler and generates a raster bitmap. Bitmap contains 1-bit per pixel values.
Optional Compression
Data can be optionally compressed to facilitate data transfer. Compression can be done using a lossless algorithm such as JBIG, or by using a lossy algorithm such as JPEG.
I/O
Transfers Data to and from printer.

FIG.2
(PRIOR ART)

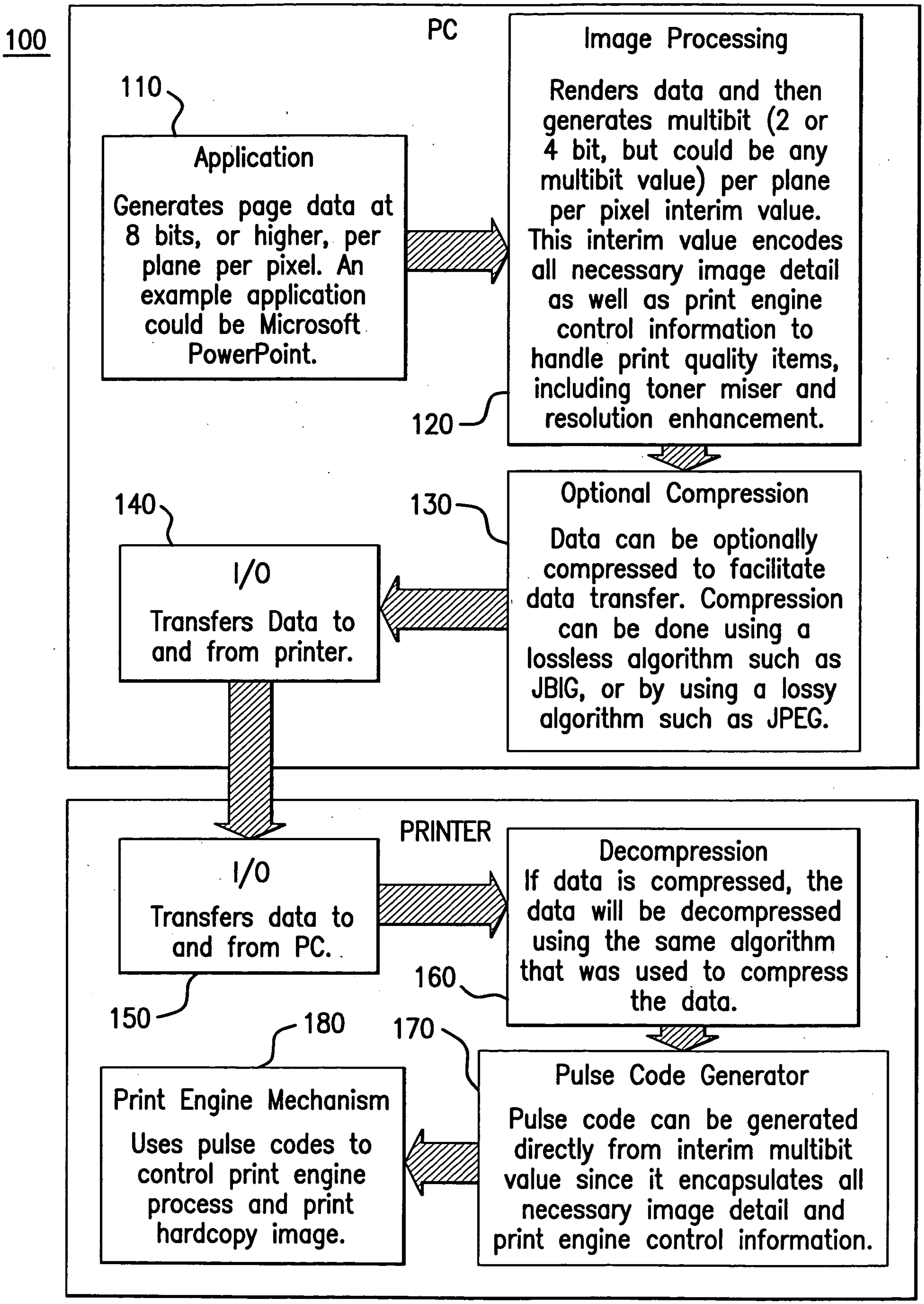
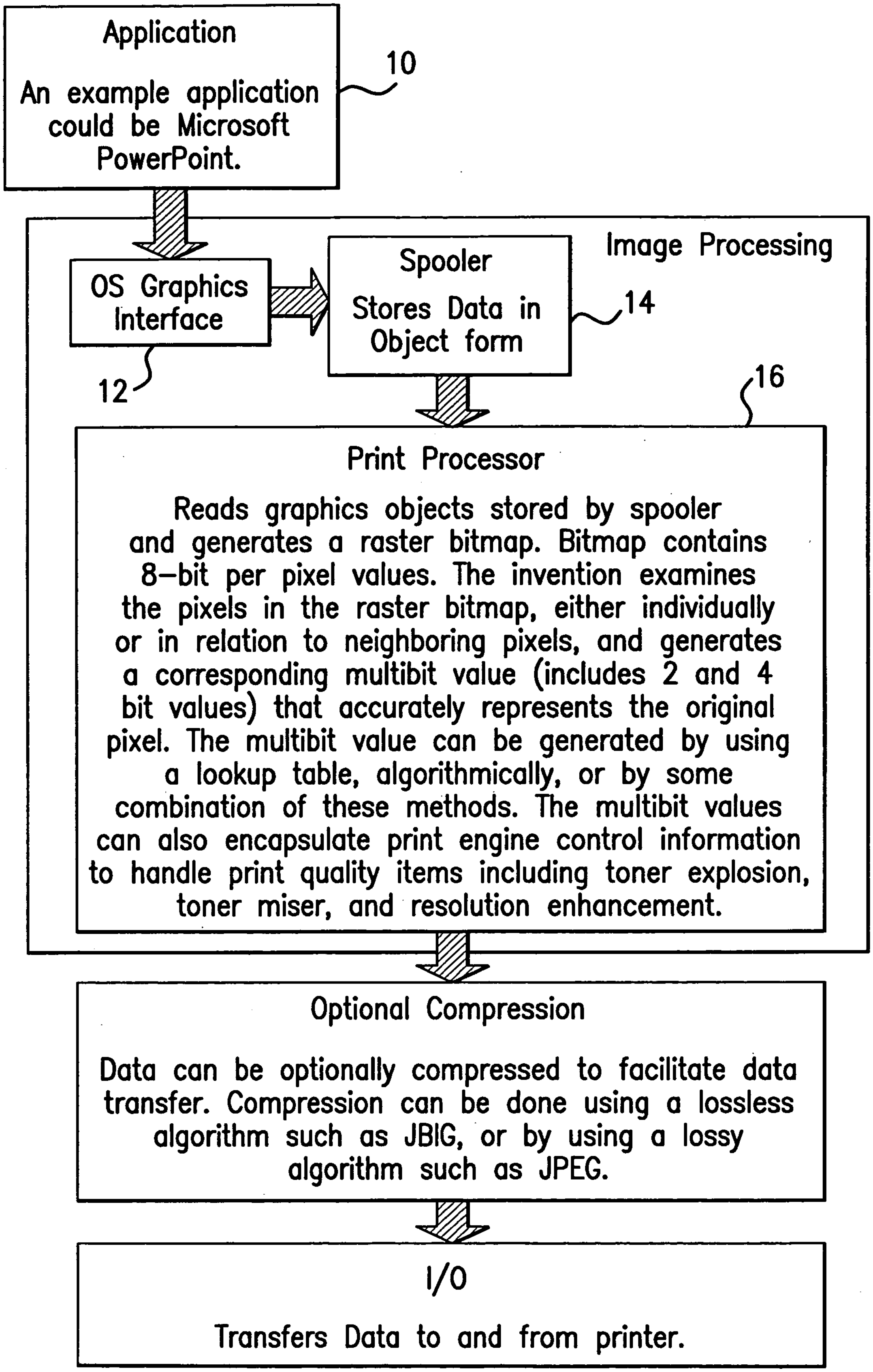

100
PC
110
Application
Generates page data at 8 bits, or higher, per plane per pixel. An example application could be Microsoft PowerPoint.
Image Processing
Renders data and then generates multibit (2 or 4 bit, but could be any multibit value) per plane per pixel interim value. This interim value encodes all necessary image detail as well as print engine control information to handle print quality items, including toner miser and resolution enhancement.
120
140
I/O
Transfers Data to and from printer.
130
Optional Compression
Data can be optionally compressed to facilitate data transfer. Compression can be done using a lossless algorithm such as JBIG, or by using a lossy algorithm such as JPEG.
PRINTER
I/O
Transfers data to and from PC.
150
Decompression
If data is compressed, the data will be decompressed using the same algorithm that was used to compress the data.
160
180
170
Print Engine Mechanism
Uses pulse codes to control print engine process and print hardcopy image.
Pulse Code Generator
Pulse code can be generated directly from interim multibit value since it encapsulates all necessary image detail and print engine control information.

FIG.3



An example application could be Microsoft PowerPoint.

Stores Data in Object form

Reads graphics objects stored by spooler and generates a raster bitmap. Bitmap contains 8–bit per pixel values. The invention examines the pixels in the raster bitmap, either individually or in relation to neighboring pixels, and generates a corresponding multibit value (includes 2 and 4 bit values) that accurately represents the original pixel. The multibit value can be generated by using a lookup table, algorithmically, or by some combination of these methods. The multibit values can also encapsulate print engine control information to handle print quality items including toner explosion, toner miser, and resolution enhancement.

Data can be optionally compressed to facilitate data transfer. Compression can be done using a lossless algorithm such as JBIG, or by using a lossy algorithm such as JPEG.

Transfers Data to and from printer.

FIG.4